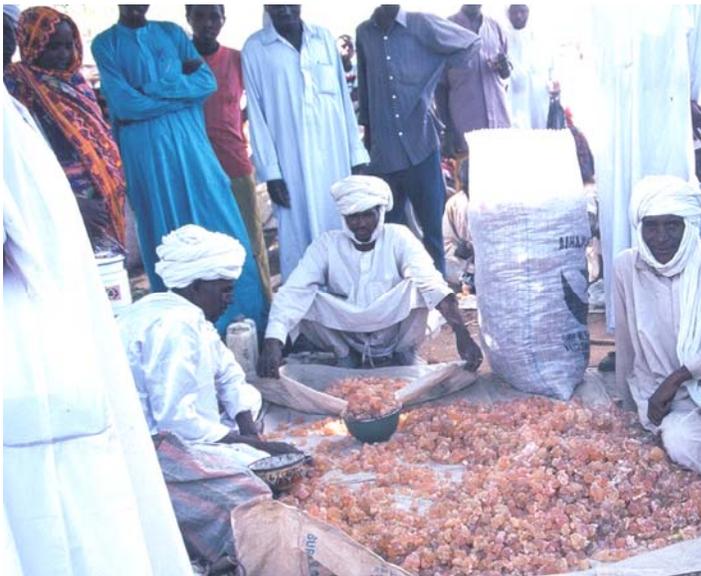


# ARD/Gum Arabic Development Program

## Final Impact Assessment Report

**Final Draft**  
March 2003

Rural and Agricultural Incomes with a Sustainable Environment (RAISE)  
Contract No. PCE-I-00-99-00001-00  
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## **ACKNOWLEDGMENTS**

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## EXECUTIVE SUMMARY

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The Final Impact Assessment (FIA) team, comprising ARD consultants Mr. Mark Huisenga and Mr. Bello Aba Yakasai, assessed the results of the Gum Arabic Program in February–March 2003. The FIA seeks to measure results achieved by the Program in the five targeted states: Bauchi, Borno, Jigawa, Kano, and Yobe. We conducted the FIA by using a combination of rapid rural appraisal methodologies, including key informant group interviews, farmer visitation, and direct observation. In every state except Jigawa, the key informant groups were composed of members of the National Association of Gum Arabic Producers, Processors and Exporters of Nigeria (NAGAPPEN). We discussed with farmers their adoption of cultivation practices and directly observed in forests, markets, and warehouses the evidence for the information we had been given.

Each of the states visited have taken initial strides to adopt some mix of the practices that were introduced at the workshops—some states more aggressively than others. However, we noted improvements in each state. These improvements are described in some detail below in line with the Gum Arabic Program’s objectives. Perhaps the most unexpected result is the emergence of NAGAPPEN as an association that is capable of effectively representing the gum arabic sector in each state and organizing economic activity through the monitoring and enforcement of improved practices. Dues-paying members, with no outside guidance, have initiated these chapters independently.

There are two business models that currently exist in the gum arabic sector. Jigawa’s business model is a supply-push approach with the government as driver in the adoption of improved practices; the business model observed in other states is driven by organic growth through spontaneous adoption of improved practices by the private sector. The Jigawa model is abetted by having a foot in the U.S. export market because of the known quality of its gum and its newness to the sector, where U.S. importers are reassured that Jigawa harvesters do not have to unlearn the bad habits existing in neighboring states. These other states, while lacking direct access to the U.S. market enjoyed by Jigawa, have a long tradition of gum arabic production and are well established in the world market.

The most telling evidence of successful adoption of practices leading to increased productive capacity is the size of gum nodules, the occurrence of adulteration, and the introduction of



traceability techniques. Results of adoption of these improved practices are being noticed by exporters who report that there is an increase in the volume of Grade 1 gum arabic that is being supplied this year compared with this time last year. The use of improved tapping techniques by farmers allows gum to exude into larger nodules, which in turn is realized in increased volumes of Grade 1 gum, which corresponds to a higher quality product: larger gum nodules are cleaner, easier to grade, sort, and bag. This increase in Grade 1 volume has occurred despite

problems of locusts and the wetter than usual rainy season, both of which have lowered overall gum production in the northern region. The exporters reported that the gum they are buying is purer than it has been in recent years. Besides larger nodules, there is less evidence of adultera-

tion and the gum is much cleaner. As a direct result, this season Nigeria exported its first shipment of gum to the United States in three seasons (no gum was shipped 2000–01 and 2001–02).<sup>1</sup>

Improved silvicultural practices are being adopted in certain locations, although farmers who are more distant from regional centers seem not to have heard about these practices. Trained trainers have been erratic in their dissemination of this information: in some states they have made concerted and targeted efforts to improve practices, in other states trained trainers have taken less initiative. An unexpected result of the workshops has been an increase in interest in gum arabic planting and opening of previously restricted forests. There is a surge in demand for seedlings.

Formal training by trained trainers has not been conducted, but an impressive amount of informal training has been done. Newly established NAGAPPEN chapters in each state have been the vehicle through which informal training has been conducted; the State NAGAPPEN chapter in Borno, for instance, estimated informally training 900–1,200 farmers; in Yobe, 1,600–3,200. Jigawa and Kano have also disseminated this information to other sector participants. As a proxy indicator, the number of newly established NAGAPPEN chapters and new dues-paying members suggests that the workshops' multiplier ratio is relatively high.

Overall, market efficiency can be demonstrated to have improved this season. Reports are clear that the workshop best practices have been adopted in each state to some extent. The two main efficiency improvements that have been adopted are (1) the introduction and enforcement of traceability practices and (2) improved silvicultural practices that have resulted in larger gum nodules. Other efficiency improvements were noted too, such as the widespread use of breathable bags to avoid gum caking and the introduction of cleaning and sorting at the village level by small traders.

Gum arabic exporters and traders seem to have grasped the concept that they must not just compete with each other but cooperate as well. As suppliers, they compete against each other on price, quality, timing of delivery, and so on. These suppliers, in their turn, rely on their own suppliers, up the chain to farmers. This network of suppliers, or "cluster," competes fiercely with each other. This blend of enterprise competition and industry collaboration may be laying the foundation for the future growth of this cluster.



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<sup>1</sup>U.S. Customs import data show that Nigeria has exported gum to the United States during this time frame; in actuality, these exports originated in Chad or Niger and were traded by Nigerian companies.

## I. INTRODUCTION

---

**F**OR FINAL IMPACT ASSESSMENT (FIA) OF THE GUM ARABIC PROGRAM, THE FIA TEAM SEEKS TO determine the extent to which the Program’s activities have realized its objectives. The goal of the Nigeria Gum Arabic Sector Development Program has been threefold:

1. To ensure a reliable and sustained supply of quality gum arabic from Nigeria to U.S. industries.
2. To strengthen the capacity and ability of Nigerian stakeholders to produce and market quality gum arabic, increasing income, creating jobs, and diversifying Nigeria’s foreign exchange earning sources by taking full advantage of the new U.S. market opportunities created as a result of the U.S. embargo on Sudan.
3. To plant more trees for controlling environmental degradation.

### I.1 PROJECT OBJECTIVES

The FIA determines progress that has been made toward achieving all three of these objectives, as supported by the Program’s activities. The most recent Program Quarterly Report states that progress has been made as follows:

- *Objective 1:* The team has gathered in-depth information about the gum arabic supply chain in five major producing states—Bauchi, Borno, Jigawa, Kano, and Yobe—and has determined the extent to which Grade 1 gum arabic originates from these locations. We developed a geographic information system (GIS) of Nigeria’s gum arabic trade in ArcView identifying major sources of supply. This information gives a general indication of the volume and quality of gum originating from gum-producing states. A major U.S. gum arabic importer has signed a two-year supply agreement with Nigerian companies.
- *Objective 2:* Through reconnaissance and a Supply Chain Mapping Workshop the team identified capacity constraints, bottlenecks, and incentive problems limiting Nigeria’s ability to produce reliable supplies of high-quality gum arabic. This information contributed directly to the design and delivery of training courses to build the capacity of key stakeholders. Comments received from Nigerian gum arabic exporters indicate that the training is improving the harvesting, sorting, and grading practices of sector participants. Reportedly, because of a perceived “rejuvenation” of the Nigerian gum arabic sector, several new producers and traders are participating in the gum arabic trade, beginning with this harvest season. In addition, a new state chapter of NAGAPPEN is currently being established in Kano as an outcome of the training in that state.
- *Objective 3:* The team has identified and assessed resources, facilities, public and private nurseries, appropriate planting environments, and local capacity for producing, planting, and tending *Acacia senegal* trees. The Supply Chain Mapping Workshop results suggest that working through communities and local nongovernmental organizations (NGOs) is the most effective means to build supply capacity. Training emphasized the importance of continued planting of *Acacia senegal*, explaining, and demonstrating proper techniques.



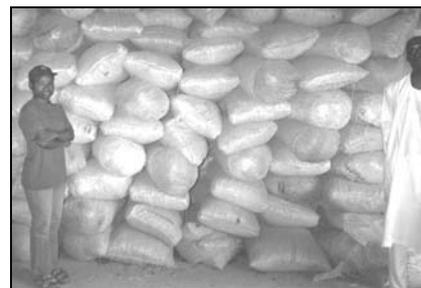
## 1.2 GUM ARABIC PROGRAM RESULTS FRAMEWORK

The Program Results Framework and corresponding activities that we assessed for their impact on the sector are described below.

### IR2.2 Productive capacity increased to deliver reliable and sustained supply of quality gum arabic

#### 1. Increased volume of sales of Grade 1 gum by Nigerian exporters from selected states

Early reports indicate that training has contributed to the increased volume of sales of Grade 1 gum; in some locations, best harvesting practices are being adopted. Nigerian exporters anticipate that sales will improve this year. One major U.S. importer has signed an agreement to buy the entire 2002–03 supply of Grade 1 gum arabic from Gum Arabic Processing Company, Ltd (GAPCO) of Jigawa State.



During the FIA we interviewed Nigerian exporters to confirm whether they are experiencing an increase in their total volume of sales and gathered specific sales data. In particular, we interviewed NAGAPPEN members to determine whether they have been able to increase absolute sales of Grade 1 gum from previous years.

#### 2. Increased unit price in selected states owing to higher quality product

Our early price information was suspect. We reported that Grade 1 gum arabic ranges in price from Naira 80–100/kg and for Grade 2 as Naira 40–60/Kg. At the exchange rate used in this Report (Naira 130/US\$), that averages about \$0.68 for Grade 1 and \$0.38 for Grade 2. Price information for this season indicates an average price range of \$0.34–0.45/kg. The price is said to drop considerably during the harvest season and rises within one or two months of harvest. Traders who can afford to stockpile can get a higher price off-season. Price variations by state seemed to be insignificant. In fact, we found this earlier information given to us by exporters to be inaccurate by a factor of two or more.



We interviewed harvesters, small traders, regional wholesalers, and exporters to determine purchase and sales price for Grades 1 and 2 gum. At each stage we have gotten informants' assessment of the gums' purity, beginning with the exporters who provide macro-level information on gum quality improvement between this year and last. Working up the chain we have

determined the extent to which best practices such as introducing procedures to ensure traceability have been adopted.

#### 3. Improved silvicultural practices increase supply reliability

Training modules on improved silvicultural practices were incorporated into the *Best Practices, Best Markets* training manual (ARD, 2002). Our recent information suggested that these improved practices are being adopted in certain locations. We met with trained trainers to determine the extent of their activity in promoting improved *Acacia senegal* silvicultural practices.



### IR2.2.3 Institutional capacity of gum arabic sector assistance organizations increased

#### 1. TOT multiplier ratio by course

ARD has trained a total of 199 participants over the course of the training of the trainer (TOT) and five state-level trainings (Table 1). Within the structure of the program, each trained trainer directly assisted with state-level training workshops. Moreover, training workshops were broadcast in whole or in part in Bauchi, Borno, Jigawa, and Yobe states, reaching an audience of uncertain size.

Through our interviews we have examined the TOT multiplier ratio, observing and evaluating actual adoption practices. Further, we interviewed trained trainers concerning the extent of their further extension efforts and local training programs that they may have led. We also interviewed the trained trainers about lessons they may have learned and their recommendations on possible next steps.

#### 2. U.S. importer requirements met by Nigerian supply chain participants from targeted states

The Jigawa State GAPCO has signed a supply contract with a leading U.S. importer, which has agreed to buy the State's total harvest for 2002–03 seasons. Nigerian exporters from other states are in the process of negotiating supply agreements. U.S. importers will not receive their first shipments from Nigeria until April–May (at the earliest). For this reason, we will not be able to obtain their timely input into this assessment of final results.

**Table 1**

Training Workshop	Dates	Facilitators	Observers	No. Trainees
Supply Chain Mapping	Apr. 2002	4	10+	58
Target	Sep.–Dec. 2002			130
Training of Trainers	Sep. 5–8	5	4	52
Jigawa State	Sep. 30–Oct. 3	9		26
Yobe State	Oct. 28–31	5		27
Borno State	Nov. 4–7	7		28
Bauchi State	Nov. 15–19	7		24
Kano State	Dec. 16–19	9	1	42
<b>Total</b>	318 attendees	46	15	199 <sup>2</sup>

### IR2.3.1 Gum arabic market efficiency improved for customers

#### 1. Increased export market share of high-quality gum from selected states

In our interviews with Nigerian exporters, we determined that, with existing information constraints, it is not possible to determine with any accuracy the market share of Grade 1 gum originating from the targeted states relative to gum originating from other producing states. We are able to make estimates on the basis of the total number of bags shipped to Kano per week, which will serve as a proxy indicator.

#### 2. Producers/harvesters in selected states increase net income from sales of higher quality gum

We interviewed harvesters and obtained information on their gross revenue generated from last year's sales relative to this year's sales. But, these data are highly inaccurate due to reasons reported below.

<sup>2</sup>Not including Supply Chain Mapping Workshop participants.

### **IR2.3.2 Platform for Nigerian gum arabic competitiveness established**

#### *1. Supply chain survey and workshop fill sectoral information gaps*

Knowledge obtained through the interviews indicates that the gum arabic cluster is becoming established. The reasons for this upbeat assessment are given below, mostly in the words of the sector's participants. We have gotten feedback on additional efforts that need to be made to consolidate the gains realized through Gum Arabic Program assistance.

### **I.3 IMPACT ASSESSMENT METHODOLOGY**

As noted above, we used a combination of rapid rural appraisal methodologies—including key informant group interviews, farmer visitation, and direct observation—to conduct this FIA. In every state except Jigawa, NAGAPPEN members constituted the key informant groups. We used an interview guide (Appendix 1) to lead group discussion on the impacts that they have observed. We discussed with farmers their adoption of cultivation practices, and directly observed in forests and markets the evidence for the information we had been given.

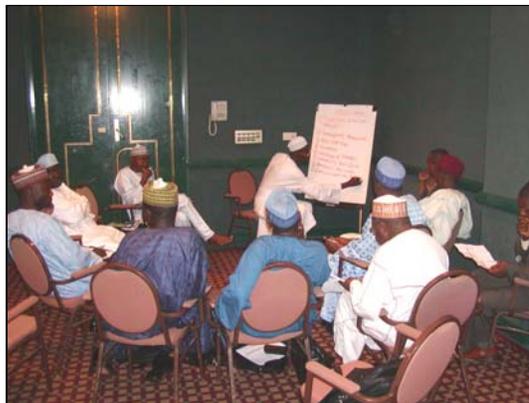
The results of our interviews in relation to the foregoing improvements are described below. First, we provide a comparative analysis of the Gum Arabic Program's results between states. Next, we give state-level findings for interviews conducted in the five states where workshops were conducted: Bauchi, Borno, Jigawa, Kano, and Yobe. Finally, we offer conclusions based on the interviews' findings.



## 2. RESULTS BETWEEN STATES

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Each of the states visited has taken initial strides to adopt some mix of the practices that were introduced at the workshops—some states more aggressively than others. However, we noted improvements in each state. We describe these improvements in some detail below in line with the Gum Arabic Program’s objectives. Perhaps the most unexpected result is the emergence of NAGAPPEN as an association that is capable of effectively representing the gum arabic sector in each state and organizing economic activity through the monitoring and enforcement of practices. Several state chapters see potential for NAGAPPEN to become a marketing and even exporting agent. Dues-paying members, with no outside guidance, have initiated these chapters independently.



### 2.1 PRODUCTIVE CAPACITY INCREASED TO DELIVER RELIABLE AND SUSTAINED SUPPLY OF QUALITY GUM ARABIC

The most telling evidence of successful adoption of practices leading to increased productive capacity are the size of gum nodules, the occurrence of adulteration, and the introduction of traceability techniques. Each of these adopted practices can have important spillover effects:

- Large nodules of gum are cleaner, easier to dry and handle, more difficult to adulterate, and indicate the use of proper cultivation techniques as nodules grow larger when tapping is done with care.
- Techniques to trace bags of gum to traders or to their point of origin make it more difficult for farmers/traders to adulterate gum as there are important reputational effects at stake, affecting possible repeat transactions.

The critical importance of these interrelated practices will become clearer in the following discussion.

#### 2.1.1 Increased volume of sales of Grade 1 gum by Nigerian exporters from selected states

During the FIA we interviewed Nigerian exporters to confirm whether they are experiencing an increase in their total volume of sales and gathered specific sales data. In particular, we interviewed NAGAPPEN members to determine whether they have been able to increase absolute sales of Grade 1 gum from previous years and in relation to Grades 2 and 3 gums. The exporters’ perceptions are the most relevant to assessing this Result since they have a broad, sectoral view of Program impacts.

Exporters are reporting that there is an increase in the volume of Grade 1 gum arabic that is being supplied this year compared with this time last year. One reason reported for this increased volume is the use of improved tapping techniques by farmers. The farmers are reported to be allowing gum to exude into larger nodules, which they attribute to the knowledge acquired from the training workshops. This increased volume corresponds to a higher quality product: larger gum nodules are cleaner, easier to grade, sort, and bag. There is also an indica-



tion that more people are involved in harvesting this year than last owing to the increased awareness of the sector on account of the training workshops. This increase in Grade 1 volume has occurred despite problems of locusts and the wetter than usual rainy season, which have lowered overall gum production in the northern region.

The exporters reported that the gum they are buying is purer than it has been in recent years. The nodules are larger, there is less evidence of adulteration, and the gum is much cleaner. However, some exporters caution that we need to wait until the end of the season to determine whether this practice will continue. As the season nears its completion, exporters report that there is usually an increase in the amount of adulterated gum.

Exporters' price paid to wholesalers for Grade 1 gum has increased from 110,000 Naira/metric tonne (MT) last year to 115,000 Naira/MT this year, or US\$ FOB price increase from \$1,050/MT to \$1,100/MT. As a general rule, transportation and handling (cleaning and sorting) costs add 17% to the wholesale price. The current world market price is \$1,150–\$1,200/MT for ordinary gum and \$1,450–\$1,500 for hand-pick select, although discounting by Sudan is being reported. *Farmers* have not taken up the practice of tagging or otherwise identifying the location of harvested gum; however, NAGAPPEN is working out a system for introducing the practice.

### 2.1.2 Increased unit price in selected states owing to higher quality product

Table 2 reflects the range of unit prices for gum arabic at each significant level of transaction reported this season. These prices are quoted from exporters in Kano, traders, and farmers. The lowest prices in the range were reported from Bauchi State, the highest prices from Yobe.

Table 2

Sector Participant	Price/50-kg Bag (Naira)	Price per (Naira)	Price per kg (US\$ at Naira 130/\$) <sup>3</sup>
Exporters	7,450–9,750	145–195	1.11–1.50
Wholesaler/trader	6,500–7,800	130–156	1.00–1.20
Small trader	5,750–6,600	115–130	0.89–1.00
Farmer	1,710–2,250	34–45	0.26–0.34

From the foregoing, and from what we learned through the Supply Chain Mapping Workshop, we know that small traders' costs are very high. They travel from house to house and village to village buying gum. This transaction- and transport-intensive activity is quite expensive; it is not surprising that the price differential between farmers and small traders is higher than the price differential between the other transaction levels. One cannot determine whether the farmer is getting a "fair" price without further study. There is considerable opportunity to add value locally through better cleaning. Most of the gum that we observed in more distant mar-

<sup>3</sup>Export prices are complicated by trade incentives: gum arabic was this year added to the list of products that can be exported duty free, there is an advantageous "Exports Proceeds Rate" for foreign currency exchanges, and Export Council members get a 15% rebate (though this may no longer apply to gum arabic). Profits are approximately \$200/MT, or \$3,000/container after incentives are considered.

kets was not particularly clean, and nodules were small—much of the gum appearing to be dust.

Exporters and traders are unequivocal in their assessment of gum quality this year as compared to last: gum quality has improved significantly as observed in the decrease—estimated to be 20%—in adulteration and the related increased size of gum nodules.

It is noteworthy that there are some important Indian exporters in the sector who exert influence on gum quality. These exporters often do not need to clean gum before shipping it for several reasons: first, labor is cheaper in India, where the gum can be cleaned and sorted at a lower price than in Nigeria even after CIF. Second, the *acacia* woody matter that finds its way into farmers' bags is used to manufacture the stems for incense. Third, Indian buyers are less stringent in their sanitary and phytosanitary requirements. For the Indian market, gum is not being cleaned and quality control is not being monitored as stringently as it is for gum destined to other markets. The net effect has been downward pressure on the price, since volume matters more than quality, and a related influence to not differentiate the product in the market.



### 2.1.3 Improved silvicultural practices increase supply reliability

Training modules on improved silvicultural practices were incorporated into the *Best Practices, Best Markets* training manual. Our interview results and visits to forests reveal that these im-



proved practices are being adopted in certain locations; we note, however, information suggesting that the more distant farmers are from regional centers, the less likely it is that they have heard about improved practices.

Trained trainers have been erratic in their dissemination of improved *Acacia senegal* silvicultural practices. In some states, such as Yobe, they have made concerted and targeted efforts to improve practices; in other states, trained trainers have taken less initiative. In no state had the trained trainers not made at least some effort to disseminate information. Borno seems to have made the most progress in adopting improved silvicultural practices through farmers' adoption of specialized tapping tools; the size of some of the nodules we were shown was truly impressive. An unexpected result of the workshops has been increased interest in gum arabic plantations and opening of previously restricted forests. We noted a surge in demand for seedlings, and we were approached outside of meetings by farmers eager to find out where to get seedlings. For those states that are initiating seedling development programs, there may be an alternate opportunity to market and sell some portion of their seedlings.

## 2.2 INSTITUTIONAL CAPACITY OF GUM ARABIC SECTOR ASSISTANCE ORGANIZATIONS INCREASED

Certainly with the rapid expansion of NAGAPPEN chapters, the capacity of gum arabic sector assistance organizations has increased, although this was not an envisioned result of the Gum

Arabic Program. The multiplier effect of the workshops is difficult to estimate or verify, given that information dissemination was conducted by trained trainers through NAGAPPEN support. Direct observation of markets and forests suggests that practices have been successfully transferred, but more comprehensive research would be needed to confirm the extent.

### 2.2.1 TOT multiplier ratio by course

Through our interviews we have attempted to determine the TOT multiplier ratio, observing and evaluating actual adoption practices. Further, we interviewed trained trainers concerning the extent of their further extension efforts and local training programs that they may have led. We also interviewed the trained trainers about lessons they may have learned and their recommendations on possible next steps.

Formal training by trained trainers has not been conducted, but an impressive amount of informal training has been done. Newly established NAGAPPEN chapters in each state have been the vehicle through which informal training has been conducted. The State NAGAPPEN chapters reported that they extended training to other sector stakeholders, estimating that they informally trained farmers and small traders within their states. These estimates are given in Table 3 below.

**Table 3**

State	No. Trained Trainers/ Workshop Participants	Total Reported Stakeholders Reached	Multiplier Ratio
Bauchi	29	NA	NA
Borno	33	900–1,200	31.8
Jigawa	38	900–1,500	31.5
Kano	51	150	2.9
Yobe	33	1,600–3,200	72.7

Also, as a proxy indicator, the number of newly established NAGAPPEN chapters and new dues-paying members further reflects that the multiplier ratio is fairly high.

### 2.2.2 U.S. importer requirements met by Nigerian supply chain participants from targeted states

We do know that Nigerian gum has been exported to the United States this season beginning in January after a three-year hiatus. Exporters are reluctant to discuss specific amounts. U.S. importer, Importers Service Corporation (ISC), has not yet completed its transaction to purchase Jigawa State’s harvest for this year.

### 2.3 GUM ARABIC MARKET EFFICIENCY IMPROVED FOR CUSTOMERS

Overall, market efficiency can be demonstrated to have improved this season. Reports are unequivocal that the best practices taught in the workshop have been adopted in each state to some extent. The two main efficiency improvements that have been adopted are (1) the introduction and enforcement of traceability practices and (2) improved silvicultural practices that have resulted in larger gum nodules. Other efficiency improvements were noted, too, such as the widespread use of breathable bags to avoid gum caking and the introduction of cleaning and sorting at the village level by small traders.

### 2.3.1 Increased export market share of high-quality gum from selected states

Interviewing Nigerian exporters, we determined that with existing information constraints it is not possible to determine with any accuracy the market share of Grade 1 gum originating from the targeted states relative to gum originating from other producing states.

### 2.3.2 Producers/harvesters in selected states increase net income from sales of higher quality gum

We interviewed harvesters and obtained information on gross revenue generated from last year's sales relative to this year's sales for the sector. But, these data are highly inaccurate owing to reasons reported below.

Net income from gum arabic harvesting has probably declined this year in Borno and Yobe, whereas it has increased for Bauchi. The locust infestation that has plagued Borno and Yobe, along with a wetter than normal rainy season, has caused less gum to be produced this year than last. The relative scarcity of gum this year has increased the price of Grade 1 gum such that farmers are getting more per unit value, but the total number of units sold has declined.

## 2.4 PLATFORM FOR NIGERIAN GUM ARABIC COMPETITIVENESS ESTABLISHED

Gum arabic exporters and traders seem to have grasped the concept that they must not just compete with each other; instead, they also need to cooperate. As suppliers, they compete against each other on price, quality, and timing of delivery. These suppliers, in their turn, rely on their own suppliers, up the chain to farmers. This network of suppliers, or cluster, competes with each other fiercely. They now realize that they have suffered from their geographic proximity in the past but can benefit from it as well, by improving their reputation for quality and service. They are appreciating that competitors can help to deepen the market for buyers.



As an organization that can meet the sector's needs of disseminating information and monitoring and enforcing best practices, NAGAPPEN is off to a promising start. As discussed above, new NAGAPPEN chapters have been established in each state, funded exclusively by dues-paying members. This was not a result envisioned by the Gum Arabic Program; the Program sought to strengthen the national association. However assessed, the results speak for themselves. State-level NAGAPPEN chapters have already achieved the following:

- *Bauchi*—establishing new chapters in 13 of the 20 local governments with over 500 members.
- *Borno*—establishing new chapter with over 1,000 dues-paying members.
- *Jigawa*—no chapter established; GAPCO representing the sector, but plans to establish chapter.
- *Kano*—establishing new chapter with over 300 members.
- *Yobe*—establishing new chapter, leased office space, with over 500 members.

This blend of enterprise competition and industry collaboration may be laying the foundation for the future growth of this cluster.

#### **2.4.1 Supply chain survey and workshop fills sectoral information gaps**

Information obtained through the interviews indicates that the gum arabic cluster is becoming established. The reasons for this upbeat assessment are described for each state below, mostly paraphrasing the words of the sector's participants. We received feedback on additional efforts that could be made to consolidate the gains realized through Gum Arabic Program assistance.

### 3. STATE-LEVEL FINDINGS

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The FIA team first visited Kano, meeting mainly with exporters and wholesalers. We then proceeded to Bauchi, Yobe, Borno, and Jigawa over the course of two weeks. In fact, we visited Jigawa and Yobe twice. The team’s findings for each state are reported below.

#### 3.1 BAUCHI

In Bauchi, the FIA team interviewed NAGAPPEN members and other individuals—several were trained trainers and others were trained in the state-level training workshops. The informants included two wholesalers, three traders, two farmers, and two extension agents (Appendix 2 names informants). Bauchi’s stands of *Acacia senegal* are located primarily in the northeast. There is a rapid climatic transition zone in this region that, unusually, allows *Acacia senegal* and *Acacia seyal* to grow within relatively close proximity. Almost all gum arabic is harvested from public tree stands growing in the wild. Information on the quantity of gum originating from Bauchi is not available. There are no gum arabic exporters in Bauchi; all of the gum from Bauchi is exported through Kano. Interestingly, Bauchi was one of three states that transmitted the training workshop through television and radio, which reportedly has increased broad awareness of opportunities in the sector.



##### 3.1.1 Wholesalers and traders

Wholesalers and traders report an overall decline in the amount of gum coming to market this season compared with this time last season, although they say that there has been an increase in



the amount of Grade 1 gum even though yields overall are down. They speculate that yields are down because there has been significantly more rain this year than is normal. Yet they attribute the significant increase in Grade 1 gum to the occurrence of harvesters segregating Grade 1 from Grade 2 gum and delivering them in separate bags. Grade 2 gum is now reported to be mixed with Grade 3. So, although overall volume is down for all gum, the volume of Grade 1 has no-

ticeably increased. The informants say that this situation is a result of the gum arabic training workshops and the influence of NAGAPPEN. Related to the increased volume of Grade 1 gum is new farmer interest; farmers are reported to be bringing gum to market looking for buyers this year than have done so in previous years.

This year’s gum arabic Kano-delivered price is reported to be Naira 120,000/MT (\$923 at Naira 130/US\$) as compared with Naira 76,000/MT (\$608 at Naira 125/US\$) last year; a price increase of 63%. Secondary market traders report that they are paying about Naira 5,800/50-kg bag and selling at Naira 6,500/50-kg bag. Incidentally, the Kano-delivered price of Grade 2 *Acacia seyal* is reported to be Naira 68,000.

Wholesalers/traders in some areas report an increase in quality this year over last because the gum is arriving in larger nodules and is unmixed with lower grades. In other locations,

there has not been a noticeable difference in quality from last year. Where there is notable difference it is attributed to the information gained from the workshops. Related to supply, informants reported that small traders in villages have started to tag their bags. Tagging is not being done where it is harvested or in small village markets, but begins with small traders in their warehouses.

### 3.1.2 Cultivation

Informants report that harvesters in some locations have adopted improved methods of tree tapping and they are letting the gum nodules grow to a larger size before harvesting than was previously practiced. An unexpected concern emerged in our visit to Bauchi villages: gum traders report that *Acacia senegal* trees growing in wild forests are being cut down at a rapid rate—mostly for sale as fuelwood. The villagers who are cutting down the trees are generally unaware of their potential economic value. The fuelwood is an inferior economic substitute; one bundle sells at the rate of Naria 50 per bundle. This activity reinforces the environmental and economic advantages to be gained by information extension through continued support of the gum arabic sector.



### 3.1.3 Trained trainers and farmers

The trained trainers said that they have been actively extending improved practices to harvesters. Most important, they have been emphasizing the importance of keeping Grade 1 gum separate from Grade 2. They have also been extending information on proper silvicultural practices, such as making incisions and use of improved tools.



### 3.1.4 NAGAPPEN

Prior to the Bauchi workshop there was not a local NAGAPPEN branch. Since the workshop, a new NAGAPPEN chapter has been formed and 13 branches established with over 500 members. Currently they are awaiting the government's approval of their status as an association. They have drafted a constitution with bylaws and have begun collecting membership dues, which have supported an inaugural event and a first chapter meeting. The vision of this NAGAPPEN branch is for Bauchi to become a gum arabic export market. To this end, they have taken steps to showcase their gum in the 28 February Kaduna international trader fair.

### 3.1.5 Other observations

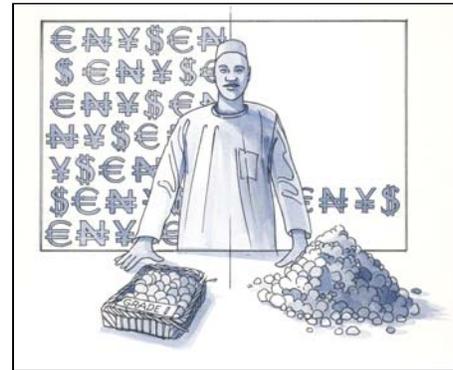
Informants noted there are more traders coming to Bauchi this year to buy gum than in previous years. There has been a general increase in interest in gum arabic, noted by the extension workers, who report many inquiries into whom they can get involved in the gum arabic sector. A number of farmers have inquired as to the availability of *Acacia senegal* seedlings because they are interested in starting commercial production of gum; however, the forest services lack seedlings. On a visit to the Northern Bauchi village of Gamawa, we interviewed several traders who said that information on the advantages of grading and sorting as expounded in the workshops

had not reached them. They lacked knowledge of the price premium that clean gum in large nodules could realize. One last, interesting note is the role of politics in the selection of workshop participants. Apparently, one trader was unable to attend the workshop because he supported the wrong political party in the past and the party in power refused to support his participation.

### 3.1.6 Main Program impacts

When informants were asked what have been the main Gum Arabic Program impacts, foremost they said that the program has created awareness of the sector “where before was little.” Other important impacts that they noted include:

- The importance of segregating Grade 1 from Grades 2 and 3 in getting higher prices (i.e., higher prices for better quality).
- Improved collection practices.
- The importance of using breathable bags.
- Rudimentary testing techniques that help demonstrate the varying quality of gum.



## 3.2 BORNO

In Borno the FIA team met in the NAGAPPEN Chairman’s office. Nine NAGAPPEN members were present, 5 wholesalers, 1 small trader, and 2 extension agents. (No farmers were present because of a last-minute rescheduling.) Two of those members present had participated in the TOT workshop and all of them had participated in the Borno Workshop. The NAGAPPEN Secretary gave us a prepared presentation of their achievements in the gum arabic sector since the Borno workshop in November (the only time this happened in any state). Much of the following discussion draws on this presentation.

### 3.2.1 Wholesalers and traders

Traders report a significant decline in gum arabic production volumes this year compared with



this time last year. A very wet rainy season is one contributing factor, but the main factor is locust infestation. The locusts defoliated the *Acacia senegal*, affecting the trees’ ability to produce gum. Farmers, being aware of this effect, opted to cultivate more cowpeas rather than harvest gum (discussed in greater detail in Section 3.5). On the other hand, this year has been the State’s most successful ever in shipping unadulterated Grade 1 gum. Wholesalers have been shipping about 220

MT/week since November following the workshop. They could not report on last year’s volume because, as they stated, they were not shipping unadulterated gum. According to the wholesalers present, exporters have said that Borno has increased its export market share because of the high gum quality. Wholesalers’ unit prices this year are Naira 110–115,000/MT, compared with last year’s range of Naira 80–85,000/MT.

Quality improvements, a contributing factor to increased Grade 1 gum trading volumes, are demonstrated by the fact that there have been no reports from exporters of adulterated gum this year. Gum sorting and drying are now happening at two points in the supply chain. First, small traders sort and dry gum they receive from farmers at the village level and, second, when bagged gum is received at the wholesalers' warehouses. NAGAPPEN has taken a highly active role in quality assurance. The association now monitors shipments out of every warehouse to make sure that the gum is clean before going to Kano; to this end they have hired staff whose job it is to monitor the shipments. Curiously, sector participants in Borno have not differentiated their gum to the extent found in Yobe, where there are three classifications of Grade 1 gum and several more sub-classifications.



### 3.2.2 Cultivation

Improved cultivation practices have been adopted since the November workshop. One village, Gubia, actually duplicated the tools that were distributed at the workshop. They found that the use of these tools increased gum nodule size significantly. Traders report that they can tell the difference in nodule size this year without even opening the bags. The State government is also taking a more active role in cultivation; it is clearing 60,000 ha. of scrub land for planting *Acacia senegal* trees. Many individual farmers have opened new forested lands and plantations since the workshop. NAGAPPEN reports that, from November, farmers have planted 65,000 seedlings. Members suggested that gum supplies could be increased even more by adding untapped supplies from the northeast. This area is not currently tapped because people do not live there; if water and transportation were available here, these sites could be highly productive.



### 3.2.3 Trained trainers and farmers

Those trained trainers and farmers who are in Borno have played an active role in disseminating information. Traditionally after each harvest season, Borno traders have made a practice of visiting the supplying villages and telling farmers what they learned that season. This year the traders did not wait. Immediately following the November workshop, trained trainers and Borno workshop participants went to the villages to disseminate their information on best practices so that they could influence the coming harvest. NAGAPPEN members estimated that they reached 150–200 people in six villages (900–1,200 villagers) within weeks.

Traders have also improved their practice of tracing gum to its point of origin. Previously, Borno traders had a system of writing traders' names on bags as a means of identification. When bags reached the warehouses, they were given lot numbers that could be traced back to the traders. This system was used haphazardly and information was not maintained. After the workshop, the system began to be followed through systematically, without exception, and in-

formation on lots, traders, and points of origin are all being maintained and have been used for reference. NAGAPPEN trained small traders on bag identification to implement the system.

The foregoing accomplishments were done without any external donor or government assistance. Television broadcast of portions of the workshop brought further attention to the sector, raising general interest and awareness.

### **3.2.4 NAGAPPEN**

Since November NAGAPPEN has grown from nothing to having over 1,000 dues-paying members. Every sector participant is expected to contribute something to the association. One of the association's services is that it now enforces quality control and product traceability. Prior to the November workshop, the gum arabic sector had no relationship with the government; since then, the State government has taken an active interest in the sector. NAGAPPEN enjoys newly established relationships with the ministries. The government's interest was recently demonstrated through its gift to NAGAPPEN of six new cleaning machines and 60,000 ha. of newly opened forest.

NAGAPPEN has independently spearheaded best practices workshops for villagers and small traders, as described above. The association has had three chapter meetings. According to members, they have developed a plan to conduct mass training in rural villages over the coming year, once their official registration is complete.

### **3.2.5 Other observations**

The gum arabic sector in Borno is very dynamic, which is reflected by what the local NAGAPPEN chapter has accomplished in a few short months. There was one report that university staff have followed up on the workshop with its own training. We could not verify this claim or find out what subjects the training might have covered. Grades 1 and 2 gum arabic both grow in Borno. Traders say they are able to keep from intermixing the two grades according to the villages from which they originate. Villages are in one growing region or the other. Traders in these markets know which gum the area produces.

## **3.3 JIGAWA**

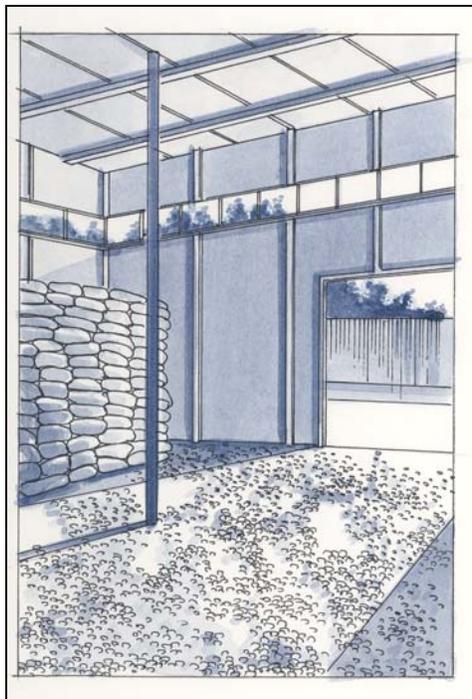
We met at GAPCO's offices in Maigatari; 18 key informants were present: 7 farmers, 1 small trader, and GAPCO staff. All but two of those present had participated in either the TOT workshop or the State-level training workshop.

### **3.3.1 Wholesalers and traders**

This year Jigawa estimates that it will harvest up to 168 MT of gum arabic within for shipment to ISC in the United States. To date, GAPCO has harvested maybe up to 50. The second largest of Jigawa's 10 plantations was affected by locusts, lowering its overall volume of production. Conditions in Jigawa were generally more favorable than in neighboring states this season; it is therefore unclear why Jigawa will not get more than 168 MT of gum this season. In contrast to other states where harvesting is done by farmers, Jigawa mostly hires "casual labor," paying them a rate of Naira 200/day (Naira 50/day over the government rate). This day labor reportedly has been trained in harvesting best practices.

GAPCO anticipates that the quality of its gum will be very high, although its laboratory technicians have not yet been trained, so this statement is unverifiable. The size samples that we saw in the warehouse that we visited were  $\frac{1}{2}$  to  $\frac{3}{4}$  inches on average. Jigawa's *Acacia senegal*, from the reports, seem to be high yielding. Farmers (as opposed to casual laborers) who we interviewed said that they are getting large nodules in two weeks; in other states similar size nodules take 4–6 weeks to form.

GAPCO has established warehouses in five collection points, one in each of Jigawa's zones. Gum is cleaned, sorted, and bagged in these locations. The bags carry GAPCO's label in an effort to establish its gum as a brand; each bag is individually tagged to ensure traceability. Bags are shipped by truck from these zonal warehouses to the main warehouse in Maigatari, where the gum is again cleaned and sorted to ensure quality control. The quality control system that they have in place seems to be well conceived, and has the potential to allow managers to trace gum back to the hectare from which it originates. The challenge will be for GAPCO to enforce these standards when they start buying gum from farmers who are outside of GAPCO's reserve boundaries.



GAPCO's board this week is meeting to establish its gum's selling price. We found GAPCO's management's lack of awareness of current wholesale prices for Grade 1 gum disconcerting. They turned to us for this information and sought our advice on a possible, target-selling price. GAPCO managers lack private sector experience and may need training in demand and supply forecasting techniques, as well as techniques on how to use such forecasts in conjunction with gathering market intelligence in order to set prices responsively.

### 3.3.2 Cultivation

Jigawa started planting a 900-ha. reserve of *Acacia senegal* 22 years ago, and has planted trees every season since then. Only 500 ha. are now ready for tapping; trees on 400 ha. of the reserve have yet to mature to tapping age. Jigawa has a program to develop seedlings from high-yielding trees. To this end, the State government has established a Naira 150 million program to develop seedlings. A Ph.D. plant breeder from Brazil has been seconded to Jigawa by IITA to improve the plant genetics of the species. High-yielding trees are identified and tagged. Last rainy season, 77,000 seedlings were distributed throughout the State.

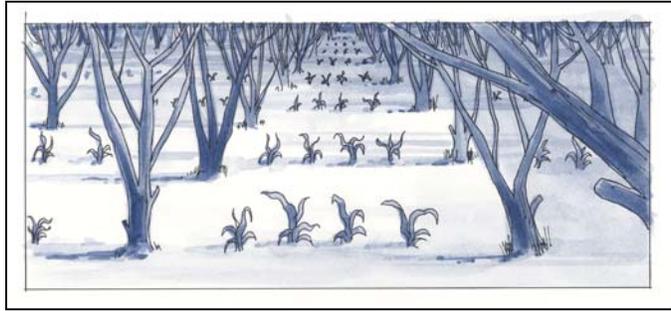
### 3.3.3 Trained Trainers and Farmers

Trained GAPCO managers and a small number of farmers have actively been involved in training extension since the workshops. They report having trained 60–100 farmers and tappers per workshop participant, or an estimated 900–1,500 overall. We found farmers to be enthusiastic about gum arabic's potential; as they said, they see the sector as interesting, potentially

profitable, and gum arabic does not interfere with other crops, meaning that intercropping is possible.

### 3.3.4 NAGAPPEN

A Jigawa NAGAPPEN chapter has not been established, although GAPCO's managing director said that the State plans to start a chapter in the coming weeks.



### 3.3.5 Other observations

Two observations follow; one speculating about the reason for the low volume of gum (168 MT) that GAPCO has to ship and the second considering Jigawa's entry into the gum arabic market.

First, other central markets in the region have been shipping 30–100 MT of gum to Kano each week since January. These data indicate that GAPCO has been bringing in on average 5–6 MT/week, considerably lower than other states. This low level of output may be explained by a number of reasons. One is that this is a new venture, and management is still learning the business. Another reason could be attributable to the lack of working capital to buy gum from farmers or to pay casual laborers. The most likely reason, though, is the old age of trees in the mature plantations.

A second observation is that there exists two business models in the gum arabic sector. Jigawa's business model is a supply-push approach with the government as driver in the adoption of improved practices; the business model observed in other states is driven by organic growth through spontaneous adoption of improved practices by the private sector. The Jigawa model is abetted by having a foot in the U.S. export market because of the known quality of its gum and its newness to the sector, where U.S. importers are reassured that Jigawa harvesters do not have to unlearn the bad habits existing in the other states. These other states, while lacking access to the U.S. market enjoyed by Jigawa, have a long tradition of gum arabic production and are well established in the world market without exporting to the United States.

## 3.4 KANO

The FIA team interviewed NAGAPPEN members and others involved in the gum arabic trade in Kano on 23 February. Most of these informants were participants in the TOT or State-level workshops. The interviewees consisted of 12 people: 7 exporters, 4 wholesalers, and 1 farmer. Kano's exporters handle most of Nigeria's gum arabic exports, more than 80%. One of these exporters, Dansa Foods, also has processing operations. Kano is the center of Nigeria's gum arabic business, but does not produce significant amounts (Appendix 2 names key informants). This is the main section reporting the observations of exporters. Following are the findings of the interview.

### 3.4.1 Wholesalers and traders

They report higher exporter demand for gum and an increase in the supply of gum coming from farmers compared with this time last year. So far this year, there have been no reports of cases of adulteration. Moreover, the overall quality of gum has improved, according to them, by about 20% on the basis of nodule size, moisture content, and presence of impurities. However,

they are concerned that the price of this higher quality Nigerian gum is now higher than the price of Chadian gum. They report paying 105,000 Naira/MT for Nigerian gum versus 95,000 Naira/MT for gum from Chad. They are concerned that this price differential might affect demand for Nigerian gum; however, Nigerian gum this year is notably higher quality than the gum from Chad. Further, they report paying higher rates for this purer gum to small traders.



### 3.4.2 NAGAPPEN

A local chapter of NAGAPPEN is in the process of drafting a charter. We witnessed considerable enthusiasm for this endeavor. They have prepared bylaws, have signed up initial members, and have had three formal meetings. Members have paid dues of 2,000 Naira to contribute to the charter's initiation. They see the potential role of NAGAPPEN as disseminating information, industry self-regulation, and generating cooperation among members in the industry. Their highest priority is to be able to sustain the quality and quantity of Grade 1 gum until Nigeria is again a leading supplier.

### 3.4.3 Other observations

Reliable data on the volumes of gum exported by Nigeria are very difficult, if not impossible, to obtain. The reasons for this unreliability are that gum is brought into Nigeria illegally from Chad and sold as Nigerian gum, and there is no way to determine the actual volume of this informal trade. Another reason is that gum exported to India is often bagged as Grade 2 or Grade 3 to evade higher import duties in India. Nor are all shippers willing to report the amount of gum arabic that they are shipping. NAGAPPEN is currently seeking a way to get more accurate information from shippers and customs on the Grade 1 gum trade volumes. Several of the interviewees said that they are interested in integrating backward to producing *Acacia senegal* on plantations, which they linked to the influence of the training workshops.



## 3.5 YOBE

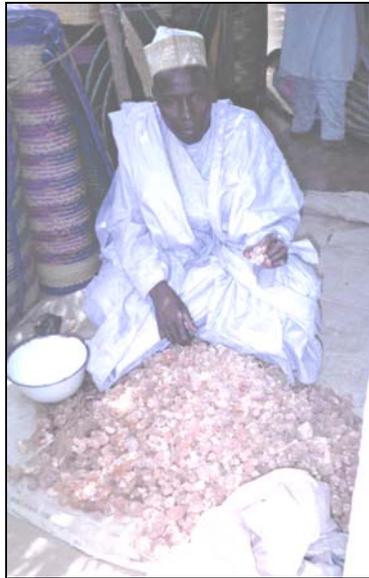
In Yobe, the FIA team interviewed 22 key informants: 4 wholesalers, 9 traders, and 9 farmers. Of these informants, 4 were TOT workshop participants and 15 participated in the Yobe State workshop. We met at the newly established, local NAGAPPEN chapter's office in Damaturu. We also visited one farm village, two forests, and one village market where gum is sold.

### 3.5.1 Wholesalers and traders

We did not meet with any wholesalers, and we were not aware if any are located in Yobe. As in Borno, traders reported problems of locust infestation, which has significantly reduced production volumes this year compared with last. Contributing factors to production declines were

also reported. Cowpea harvesting normally occurs when the first cutting of *Acacia senegal* is done and competes for the farmers' time; taking this into account and the known effects of locust defoliation on gum production, farmers concentrated their efforts on cowpea. In some areas farmers reported that theft is a problem, with harvesters picking gum from trees that they did not cut. Yields are down across the area—by as much as 70% in some places. Last year gum was traded out of Damaturu at the volume of 125 MT/week over five months; this year they are averaging about 30 MT/week. Traders also kept about 100 MT in storage last year for sale after harvest when prices increase. They are unlikely to store any gum this year.

Yobe traders' selling prices this year are Naira 115,000/MT. Yobe traders mostly deal di-



rectly with exporters and a small amount of wholesalers; partly this reflects Yobe's reputation for high-quality gum, which draws the exporters to compete directly for its gum. The prices paid by exporters in Yobe this year have been higher than recent years, reflecting the scarcity of gum resulting from the locust infestation.

Yobe produces mostly Grade 1 gum. The Yobe market shows a marked degree of sophistication. Yobe traders distinguish three types of Grade 1 gum: hand-picked select, ordinary, and dust. They further distinguish gum by color, ranging from light to medium to brown, which originate in different areas of the State. The traders are able to provide services; depending on buyers' needs they hand-picked select gum, clean all types of gum, or segregated it by color. There are certain buyers who prefer the lighter color gum and are willing to pay a premium for it, with a cash advance. All of Yobe's gum goes directly to Kano. Traders bag gum in breathable 50-kg bags to avoid caking. Yobe traders claim

that they are ready to start exporting directly and believe they can meet buyer specifications. Their readiness is demonstrated by a pre-approved export letter of credit that they have been issued by a local bank.

### 3.5.2 Cultivation

This year's gum nodules are larger than those harvested last year. Traders and farmers both attribute this to the workshop's influence and NAGAPPEN's efforts thereafter to disseminate information on best harvesting practices. Reportedly, not all farmers are convinced of these practices' efficacy, some having adopted the techniques and others experimenting to see which techniques contribute to better yields. The cuts on the trees in the forests that we visited were done as illustrated in the training manuals, without the bark being stripped or the tree savaged. We observed trees where evidence of cutting in prior years showed poor harvesting practices. We also observed and heard further report that large expanses *Acacia senegal* forest in Yobe are untapped, usually because people do not live in the vicinity or simply because they assume that the gum has too low an economic value to make it worth their while. This is an interesting conclusion that we discuss a bit more below.



### 3.5.3 Trained trainers and farmers

Segments of the workshop were broadcast locally on the television and radio networks. Soon after the Yobe workshop, traders established a local NAGAPPEN chapter and within weeks used their network to disseminate information on adulteration and cleaning. As a result of the workshop and the multiplier effect of information dissemination, the traders proudly reported that they have not had one case of adulteration this year; last year there were many cases. The participants estimate that each of them trained another 50–100 other farmers, reaching 1,600–3,200 farmers.

From the traders' behavior, the most significant new practice learned at the workshop is the potential importance of tagging or marking bags to make them traceable. We observed that every bag sold in the market bore the traders initials. Through NAGAPPEN's local influence, every bag is traceable to a trader. This practice, claim the traders, has helped them improve management of the market and discourages adulteration. They are now able to monitor and share information on the quality of the gum that each small trader and farmer delivers. This works to the advantage of the farmers/small traders, too, by helping them establish a reputation for quality.

### 3.5.4 NAGAPPEN

The Yobe chapter of NAGAPPEN was created soon after the Yobe workshop was completed. The chapter has 500 members and has met three times. Members are in the process of registering as an official association, in anticipation of which they have rented space for six months



through their membership dues. They seem to be quite focused on doing a few things very well: through their network they have introduced gum traceability practices and member monitoring (described above); they have begun collecting *Acacia senegal* seeds from high-yielding trees, and have brokered an arrangement with the state government to buy the seeds from NAGAPPEN. More impressively, they have made plans and, when officially registered, will begin to execute a branding strategy. Their strategy includes a scheme to mark and number bags, as advised in the workshop, and to create a recognizable *Yobe* brand for the State's gum arabic; the brand would be an exclusive trademark of NAGAPPEN in Yobe. The chapter's leaders are concerned that Yobe has been too low a priority in the sector's development, particularly when, they contend, the State produces

the most Grade 1 gum.

The State government's role in the sector has been limited, partially because Yobe is not a resource-rich State. The government is this year producing and distributing 10 million seedlings using NAGAPPEN's selected germplasm; 2.5 kg of seeds cost Naira 500, some of which will be sold outside the State. Beyond this collaboration, there are no other government programs that support the sector.

### 3.5.5 Other observations

Many farmers who live farther away from Damaturu have not been exposed to the best practices and are unaware of the economic advantages of harvesting gum arabic. There is a miscon-

ception in these areas that gum is not as profitable as cowpea. We spoke with villagers who corroborated the statement. The market price of cowpea is Naira 34, compared with gum arabic, which is Naira 45. Both crops require human labor, but, depending on location, gum is not as labor intensive. Meanwhile, gum arabic has minimal input costs, travel to a forest might be one depending on a villager's location. Cowpeas, on the other hand, requires seed and fertilizer, not to mention weeding, watering, monitoring, and other labor-intensive measures. On the basis of these merits, one could argue that farmers should specialize in gum arabic. As a food-security, risk management strategy in Yobe's harsh climate, farmers at least would be prudent to combine gum arabic harvesting with cowpea cultivation.





## 4. CONCLUSION

The gum arabic market, after years of decline from a peak of 120,000 MT to as little as 65,000 produced annually, has been climbing slowly to about 85,000 MT produced per year. This growth is projected to increase in the near to medium term as consumers increasingly prefer more natural and organic food products. Concerns about food safety and product traceability are also driving market demand; while these have traditionally been challenges for Nigerians, with technological improvements to monitoring and enforcement quality control will be easier in the future. Nigerian gum has a natural FOB price advantage over Sudan and Chad on account of its port access. This is another opportunity that Nigerians can use to increase their competitiveness.

The United States consumes 60% of the world's annual production of Grade 1 gum arabic.<sup>4</sup> For the last three years Nigeria has not exported any gum to the United States. Nigeria produces about 5,000 MT annually of the 85,000 produced worldwide, or about 6%. For Nigeria's access to the U.S. market there is nowhere to go but up. Even small shipments will be a 100% increase over what is being exported now.

Compared with other export commodities, gum arabic, which ranges in value from \$1,000 to \$1,500/MT, could be considered a relatively high-value product. By comparison with other locally grown commodities, gum arabic commands higher profits (gross revenue – costs). Important nonirrigated products that are grown in areas where gum arabic grows include cowpeas, groundnuts, sesame, sorghum, and millet (see Table 4). Millet does not compete against gum arabic for labor, while the other major commodities do. Farmers face opportunity cost for food security and earnings between concentrating their labor on gum arabic versus these other crops.

**Table 4**

Commodity	Earnings in Naira/kg	Factors Affecting Input Costs
Gum arabic	34–45	Very low inputs costs (rudimentary tapping tool, labor, transportation)
Cowpeas	34	Modest inputs
Groundnuts	33 (unthashed); 64 (thashed)	High use of chemicals to prevent infestation has increased production costs significantly in recent years
Sesame	34	Relatively high inputs
Sorghum	33	33
Millet	28	28

At Naira 34–45 with low input costs, gum arabic is the most profitable crop in the region. Competing crops earn less revenue and have comparable to moderately higher input costs. From this perspective, gum arabic harvesting would seem to be a rational choice of crop for farmers to concentrate on, perhaps in conjunction with one of the other food crops.

The Gum Arabic Program has sought to educate farmers and traders on the comparative advantages of producing gum arabic. By introducing best practices in cultivation, harvesting, and marketing, trainees have learned to meet the specifications of U.S. importers and have ex-

<sup>4</sup>This amount includes unprocessed gum imported directly and processed gum imported through third countries (i.e., France, Germany, and the UK).

tended these practices to others in their locations. The sector is poised to be globally competitive through the establishment of NAGAPPEN chapters in each of the targeted states, which will be crucial to future dissemination of best practices, industry monitoring, and self-enforcement.

### 4.1 PROGRAM ACHIEVEMENTS

The Gum Arabic Program has realized the following achievements:

- The first shipments of Nigerian gum to the United States after a hiatus of several seasons started in January.
- A TOT workshop prepared 52 trainees and 4 observers to extend gum arabic sector best practices to farmers and traders in their states and the federal government.
- State-level training workshops trained 147 traders and producers drawn from Bauchi, Borno, Jigawa, Kano, and Yobe.
- Total number of trainees exceeded the targeted number (130) by over 50%.
- Training has resulted in larger nodules of gum that are cleaner, easier to dry and handle, more difficult to adulterate, and indicate the use of proper cultivation techniques, since nodules grow larger when tapping is done with care.
- Independently established NAGAPPEN chapters are being officially registered, without government support, in each of the five states, comprising at least 2,000 dues-paying members at the time of this report.
- Techniques to trace bags of gum to traders or to their point of origin have been adopted through NAGAPPEN's efforts, making it more difficult for farmers/traders to adulterate gum since there are important reputational effects at stake, influencing possible repeat transactions.
- The Gum Arabic Supply Chain Mapping Workshop, attended by almost 60 sector participants, revealed (1) the functions that are performed at each step of the chain and how transactions are executed, and (2) the constraints, opportunities, and operational issues confronting the sector, and issues outside of their businesses over which they have no control (i.e., policy). In addition, a geographic map of Nigeria was developed that shows the distribution, volume, and concentration of all grades of gum.
- Coordination with U.S. gum importers provided valuable information on product specifications and best practices for the gum arabic training manual, *Best Practices, Best Markets*.
- Nigerian gum arabic producers and traders have been observed to be adopting best silvicultural and best marketing practices, with the objective of accessing U.S. markets.
- Laboratory equipment was procured, installed, and commissioned for GAPCO at its laboratory site in Maigatari.
- Expanded market linkages have been realized between Nigerian gum arabic exporters and ISC Gums, a major U.S. importer.
- Candidate identified and interviewed for U.S.-based training in gum arabic analysis techniques; the candidate will be responsible for supervising the Maigatari laboratory.

#### 4.2 NAGAPPEN RECOMMENDATIONS FOR FUTURE ASSISTANCE

A final point of discussion that we had with those whom we interviewed was any possible future role that USAID could play in the sector. The exporters particularly suggested that USAID support would be welcome in the following areas:

- Seedling production, distribution, and plantation management.
- Providing micro-credit to farmers and small traders to (1) establish new plantations, (2) provide working capital for small traders to buy and sell in line with demand, and (3) buy fencing or other material that can be used to protect trees from nomadic herders' animals.
- Institutional strengthening of NAGAPPEN to help local chapters improve their management and help them monitor and enforce best practices, improve warehouse systems, and record-keeping.
- Continuing to conduct training workshops, especially targeting the local levels, that supports further extension programs of gum arabic best practices.
- Get people to where the trees are by supplying local infrastructure, including water and transportation.
- Establish gum arabic testing laboratories in other states besides Jigawa.
- Assisting NAGAPPEN to establish a system of gum traceability and certification.
- Establishing a laboratory at the Lagos port to test the export quality of gum.





## **APPENDIX I: FINAL IMPACT ASSESSMENT INTERVIEW GUIDE**

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### **EXPORTERS**

- Volume: Total Nigerian Grade 1 gum sales forecast for this year (metric tonne [MT]), last year (MT), second-country sales (MT)
- Quality: Purity of Grade 1 gum this year (% adulteration), last year, no. cases of adulteration observed/reported, vs. last year
- Destination: Destination of exports, % to U.S. buyers (MT), compared with last year
- Demand: World market price (US \$), Nigerian FOB price (US \$ and Naira/MT)
- Supply: Total Grade 1 gum bought this year (MT), last year (MT)

### **WHOLESALEERS/TRADERS**

- Volume: Total Grade 1 gum sales forecast for this year from purchasing area by state (MT), last year (MT)
- Quality: Purity of Grade 1 gum this year (% adulteration), last year, no. cases of adulteration observed/reported, vs. last year
- Demand: Exporter price paid/MT (Naira), last year
- Supply: Total Grade 1 gum bought this year (MT), last year (MT), area of origination

### **CULTIVATION**

- Silviculture: Tapping techniques (visual evidence), tools used, harvesting frequency, yield (kg/ha.)
- Harvested area: Estimated ha. harvested in village area, government harvesting policies/supervision
- Afforestation/No. hectares of new planting, no. hectares new forest reserves opened to cultivation,
- Reforestation: Plans for future planting, no. of seedlings produced, no. seedlings distributed/sold, no. of seedlings planned

### **“BEST PRACTICES” TRAINED TRAINERS/STATE-LEVEL WORKSHOP PARTICIPANTS**

- Extension: Estimated no. of small traders/farmers trained in best practices, estimated no. of workshop participants conducting extension visits, no. of villages where training occurred
- Adoption: Average nodule size, grading/sorting procedures introduced, tagging/traceability processes introduced

### **NAGAPPEN**

- Have steps been taken to establish a NAGAPPEN chapter in the state? If so, what stage is it at in the process?
- How many members are there currently, if any?
- How many meetings or other formal activities have there been, if any?
- What is NAGAPPEN’s function envisioned to be, if any?
- Recommendations for future USAID involvement in the gum arabic sector?



## APPENDIX 2: IMPACT INFORMANTS

### BORNO

S/NO.	NAME	POSITION
1	ADAM MOHAMMED	WHOLESALER
2	SHUAIBU ALHAJI BUKAR	DEALER
3	ABBA B.G. MAUTA	DEALER
4	MALLAM USMAN YUSUF MOHD	WHOLESALER
5	ABBA KAKA M. DANSHUWA	DEALER
6	USHADARI HAMIDU	EXTENSION & TRAINING OFFICER GUM ARABIC
7	ABDULLAHI MUSA	SMALL TRADER
8	ALI ABBA GUJJA	EXTENSION OFFICER MAFR HQ. MAIDUGURI

### YOBE

S/NO.	NAME	POSITION
1	ALH. GAMBO GUJBA	TRADER
2	ALH. MODU DINA	TRADER
3	MANU ALH. DINA	WHOLESALER
4	ABDULLAHI IBN MALLAM	FARMER
5	ALH. MELE	TRADER
6	ALH. BABA GAN	WHOLESALER
7	ALH. ALABURA A. DINA	WHOLESALER
8	ABDULKADIR MOHD	FARMER
9	GONI FANNAMI	FARMER
10	MOHD DAJA	FARMER
11	ABUBAKAR LAMIDO	TRADER
12	ALH. TEWA	FARMER
13	DA'U ALABURA	FARMER
14	JAFARU AYUBA	TRADER
15	ALH. KACHALLA	FARMER
16	ABUBAKAR IBN ABAKAR	TRADER
17	ALH. ALI KUKARETA	FARMER
18	BABA KOLO	TRADER
19	AHMADU SARKI	TRADER
20	BABA GANA A FANNAMI	WHOLESALER
21	ALH. IBRAHIM TALIO	TRADER
22	LAMIDO KADAIRE	FARMER

### BAUCHI

S/NO.	NAME	POSITION
1	BELLO INUWA GALOJI	CHAIRMAN NAGAPPEN
2	ALH. ADAMU BAMA KO GOLOLO	MARKETER
3	ABDU BAWAQ CHINEDU	STAKEHOLDER
4	IDRIS IBRAHIM HALILU	STAKEHOLDER
5	ABDULLAHI A. UMAR	MARKETER
6	MOHAMMED FANNAMI	EXTENSION OFFICER
7	MUKTAR UMAR WANTI	TRADER
8	ZAKARI YAN BUBA	MARKETER
9	ABDUL-HADI MOHD	FARMER
10	MUHAMMAD SANI	TRADER
11	SURAJ AHMED	TRADER
12	TIJJANI YAU AHMED	EXTENSION AGENT
13	BELLO YARO	TRADER
14	LADAN SAMBO	TRADER

## Appendix 2: Impact Informants

### KANO

S/NO.	NAME	POSITION
1	ALH. AUWVALU IBRAHIM	DEALER
2	ALH. IBRAHIM ABUBAKAR	DEALER
3	ISYAKU UBA AHMED	EXPORTER
4	MOHD BABA DANLADI	FARMER
5	SANI NASHE	EXPORTER
6	ALH. ALI MUSA	SUPPLIER & EXPORTER
7	ALH. AUDI	DEALER
8	AHMED ABDULLAHI	DEALER
9	SAKA MURITALA ABIODUN	EXPORTER
10	BELLO DANTATA	PROCESSOR & EXPORTER
11	NASIR KHAN	EXPORTER
12	RAMSU TAHIR	EXPORTER

### GUM ARABIC TECHNICAL WORKSHOP BETWEEN GAPCO AND PERSONELS

S/NO.	NAME	POSITION
1	ABDULLAHI DAUDA	EXTENSION WORKER
2	ABDULLAHI M. HASSAN	EXTENSION WORKER
3	SUNUSI MOHD	EXTENSION WORKER
4	MUKTAR SULAIMAN	EXTENSION WORKER
5	SHAMSIDEEN SALE	EXTENSION WORKER
6	ALH. AHMAD NAMALU	FARMER
7	ALH. AMINU BABURA	MARKETER
8	BAGANA MOHD H.	FARMER
9	ALH. ABDULLAHI	FARMER
10	HABU A. HAMIDU	FARMER
11	YAKUBU HARUNA	FARMER
12	HASHIMU MOHD	FARMER
13	MOHD YAHAYA UBA	PERSONNEL OFFICER
14	MOHD SAMBO ABUBAKAR	P.R.O.
15	MOHD. MOHAMMED	STORE ASSISTANT

### PEOPLE ON THE HIGH TABLE

S/NO.	NAME	POSITION
1	ALH. H.M. TURABU	MD & CE (GAPCO)
2	ALH. ABDURRAHAM	ABD (GAPCO)
3	AHMADU YUSUFU	AGM (OP) (GAPCO)